

FORM PTO-1390 (REV 11-98)		U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER GH-00322
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371			U.S. APPLICATION NO. (if known, see 37 CFR 1.5) 09/623542
INTERNATIONAL APPLICATION NO. PCT/AU99/00135	INTERNATIONAL FILING DATE (dd/mm/yyyy) 05/03/1999	PRIORITY DATE CLAIMED (dd/mm/yyyy) 05/03/1998	
TITLE OF INVENTION SCREENING APPARATUS			
APPLICANT(S) FOR DO/EO/US KUHMENON, Mauri			
<p>Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:</p> <ol style="list-style-type: none"> <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(l). <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). <input checked="" type="checkbox"/> has been transmitted by the International Bureau. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). <input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)). <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) <ol style="list-style-type: none"> <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). <input type="checkbox"/> have been transmitted by the International Bureau (<i>Not Known</i>). <input type="checkbox"/> have not been made; however, the time limited for making such amendments has NOT expired. <input type="checkbox"/> have not been made and will not be made. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). <input type="checkbox"/> An oath or declaration of the inventor(s). (35 U.S.C. 371(c)(4)). (<i>To Be Filed Soon</i>) <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). <p>Items 11 to 16 below concern other document(s) or information included:</p> <ol style="list-style-type: none"> <input checked="" type="checkbox"/> An Information Disclosure Statement (IDS) under 37 CFR 1.97 and 1.98. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. (<i>To Be Filed Soon</i>) <input type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. <input type="checkbox"/> A substitute specification. <input type="checkbox"/> A change of power of attorney and/or address letter. <input checked="" type="checkbox"/> Other items of information: <ol style="list-style-type: none"> <input checked="" type="checkbox"/> International Search Report (PCT/ISA/210); <input checked="" type="checkbox"/> International Preliminary Examination Report (PCT/IPEA/409) inclusive of substitute sheets 2, 8 and 9, filed 21 December 1999, in which <u>amendments under Article 34 were made to description and claims;</u> <input checked="" type="checkbox"/> List Of Prior Art Cited In IDS (Form PTO-1449). <input checked="" type="checkbox"/> The undersigned <u>intends to file</u> the following document(s) within the next two months: <ol style="list-style-type: none"> <input checked="" type="checkbox"/> A Declaration of Inventor(s) And Power Of Attorney form; <input checked="" type="checkbox"/> An Assignment document; and <input checked="" type="checkbox"/> A Small Entity Statement. 			

533 Rec'd PCT/PTO 05 SEP 2000

U.S. APPLICATION NO. (if known, see 37 CFR 1.5) 09/623542		INTERNATIONAL APPLICATION NUMBER PCT/AU99/00135		ATTORNEY DOCKET NUMBER GH-00322	
17. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492(A)(1)-(5)):				CALCULATIONS	PTO USE ONLY
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO.....\$970.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO.....\$840.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....\$760.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4).....\$670.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4).....\$96.00 ENTER APPROPRIATE BASIC FEE AMOUNT = \$970.00					
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$130.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	6 - 20 =	0	X \$18.00	\$	
Independent Claims	1 - 3 =	0	X \$78.00	\$	
MULTIPLE DEPENDENT CLAIM(S) (if Applicable):				+ \$260.00	\$
TOTAL OF ABOVE CALCULATIONS				=	\$1100.00
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).				\$	
SUBTOTAL				=	\$1100.00
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				+	\$
TOTAL NATIONAL FEE				=	\$1100.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				+	\$
TOTAL FEES ENCLOSED				=	\$1100.00
				Amount to be refunded	\$
				charged	\$
a. <input checked="" type="checkbox"/> Check no. <u>4265</u> in the amount of \$ <u>1100.00</u> to cover the above fees is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input type="checkbox"/> The commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. _____. A duplicate copy of this sheet is enclosed. NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive 37 CFR 1.437(a) or (b)) must be filed and granted to restore the application to pending status. SEND ALL CORRESPONDENCE TO: James Ray & Associates 2640 Pitcairn Road Monroeville, PA 15146					
				SIGNATURE	
				James R. Stevenson	
				NAME	
				38,755	
				REGISTRATION NUMBER	

533 Rec'd PCT/PTO 05 SEP 2000

TitleSCREENING APPARATUSField of the Invention

5 This invention is for a screening apparatus particularly suited for screening particulate material, although it may also be used for crushing, mixing or blending particulate material.

Background of the Invention

10 It is often necessary to screen particulate material in order to sort it in accordance with particle size. For example when mixing concrete or when building roads, it is necessary to screen gravel in order to sort into piles of different mean gravel size. Conventional screening apparatuses use screens and rotating or vibrating beds to select given particle size output. All particles which are of size equal or smaller to the selected size fall through the screen while the particles of larger size are held on the screen for later removal. One notable disadvantage with the rotating or vibrating
15 bed type screening apparatuses is that they have a tendency to become clogged.

Summary of the Invention

It is an object of the present invention to provide an alternate form of screening apparatus which attempts to alleviate the problems in the above described prior art.

20 According to the present invention there is provided a screening apparatus for screening a particulate material composed of particles of different size, said apparatus including:

- a screen frame having an open bottom through which screened particles can pass;
- a plurality of banks of blades supported on the screen frame; each bank
25 having a plurality of evenly spaced blades arranged in a row and rotatable

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about a respective axis, the axes being parallel to each other, with adjacent banks of blades axially offset relative to each other so that the blades of one bank alternate with the blades of an adjacent bank, and wherein at least one bank of blades is linearly slidable along its axis of rotation to provide a predetermined amount of axial freeplay and where a sizing gap is formed between mutually adjacent blades of adjacent banks;

wherein, when the blades are rotated and a particulate material is placed on the blades, the rotating blades agitate and/or crush the material to allow particles of a size equal to or smaller than the sizing gap to pass between the blades and through the open bottom.

Preferably the blades are juxtaposed so that the blades on one bank extend transversely between the adjacent blades of an adjacent bank.

Preferably said blades are configured and juxtaposed so that if the blades of one bank were directly opposite the blades of an adjacent bank the opposed blade would intermesh.

Preferably said screen frame is in the form of a bottomless scoop or bucket adapted for coupling to an earthmoving vehicle whereby said vehicle can be controlled to manipulate said scoop or bucket to scoop particulate material into said screen frame and/or elevate said screen frame above the ground while said blades are rotated.

Preferably said screening apparatus further includes one or more hydraulic motors for driving said banks to blades said motors supported on said screen frame and wherein hydraulic fluid for said motors is derived from said earthmoving vehicle.

Brief Description of the Drawings

An embodiment of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

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Figure 1 is a plan view of an embodiment of the screening apparatus in accordance with this invention;

Figure 2 is a side view of the screening apparatus;

Figure 3 is a rear view of the screening apparatus; and,

5 Figure 4 is a view along section AA of the screening apparatus shown in Figure 1.

Detailed Description of the Preferred Embodiment

Referring to the accompanying drawings, a screening apparatus 10 for screening a particulate material composed of particles of different size (not shown) includes a screen frame 12 having an open bottom 14 through which screened particles can pass and a plurality of banks of blades 16A-16E (hereinafter referred to generally as "banks of blades 16") supported on the frame 12. In this embodiment, the frame 12 is of a form similar to the bucket or scoop found on an earthmoving vehicle such as a bobcat or front end loader but with a bottom section removed to provide the open bottom 14.

Each bank of blades 16 is rotatable about a respective axis of rotation 18A-18E (referred to hereinafter in general as "axes 18"). The axes 18 run parallel to each other although, as most clearly seen in Figures 2 and 4, axes 18A and 18E are located in a higher plane than axes 18B-18D.

20 Blades 20 of each bank 16 are evenly spaced and arranged in a single row coincident with their respective axes of rotation 18. For ease of description, the blades for the banks 16A-16E are designated as blades 20A-20E respectively. As seen most clearly in Figure 4, the blades 20A are configured so that if they were directly opposite the blades 20B of an adjacent bank 16, the opposed blades would intermesh. In this embodiment, each blade 20 is generally square in shape and has an arcuate scallop 22 formed midway between adjacent corners in each side of the blade 20. This

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leaves the blades with diagonally extending fingers 24 which can ride in or pass through the scallop 22 of an adjacent blade 20 during a portion of the rotation of the blade 20.

5 At least one of the banks of blades 16 and indeed preferably all of the banks of blades 16 are able to slide linearly along their respective axes of rotation 18 to provide a predetermined amount of axial freeplay.

10 A sizing gap G is formed between a blade 20 of one bank 16 and adjacent blades 20 on an adjacent bank 16. With reference to Figure 1, a sizing gap G is formed between the blade 20D2 of bank 16D and blades 20E2 and 20E3 of bank 16E. The sizing gap determines the size of particles that can pass through the apparatus 10. As is apparent from Figure 1, the sizing gap G, may be different between different adjacent pairs of banks 16, (compare gaps G1 with gap G2).

15 When in use, drive is provided to the banks 16 causing them to rotate and a pile of particulate material is placed on the blades 20. The rotating blades agitate and/or crush the particulate material to allow particles of a size equal to or smaller than the sizing gap to pass between the blades 20 through the open bottom 14. It will be appreciated that as the blades 20 rotate they may also act to crush or break particles to a size so as to fit through the sizing gap.

20 As is apparent from Figure 1, the blades 20 of adjacent banks 16 are staggered so that the blades of one bank alternate with the blades of an adjacent bank looking in the axial direction. Thus, referring to Figure 1, the blades 20A of bank 16A alternate with the blades 20B of bank 16B. Also the blades 20 of at least some of the banks 16 overlap each other, see for example blades 20A which overlap with (ie extend transversely between) adjacent blades 20B. However, the degree of overlap is not
25 necessarily uniform between adjacent banks. For example in this embodiment, between banks 16B, 16C and 16D the degree of overlap of adjacent blades on adjacent banks is less than the overlap between banks 16A and 16B; and, banks 16D and 16E.

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As shown in Figure 4, a row of plates 26 is provided along the inside on each side of the frame 12. Each plate 26 is disposed between adjacent blades 20A/20E on banks 16A/16E respectively. The plates 26 effectively act to block gaps between the banks 16A and 16E and the adjacent sides of the frame 12.

- 5 The axial freeplay of the banks 16 is provided by forming the blades 20 on respective sleeves 28 which in turn are slidably mounted on respective rotatable axles 30. In order to allow for a transfer of torque between the axle 30 and its respective sleeve 28, both are formed with a non circular (in this instance square) cross section. Although, in alternate embodiments, these sections can be circular and keys or other
- 10 arrangements provided in order to allow the transfer of torque from the axle 30 to its sleeve 28. The degree of axial freeplay of each sleeve 28 is limited by conventional means such as of stops and flanges. The freeplay can be limited to ensure that a bank 16 cannot slide axially more than one half the distance between adjacent blades 20.
- 15 Drive is imparted to the bank 16 via hydraulic motors 32A and 32B which are attached to the frame 12. The hydraulic motors 32A, 32B may receive hydraulic fluid from a further hydraulic motor which typically would be part of an earthmoving vehicle to which the apparatus 10 is connected. The hydraulic motors 32A, 32B have respective pulley wheels 34A, 34B to allow a transfer of torque to the banks 16.
- 20 The axle 30 for each bank of blades 16 is also provided with a respective pulley wheel 38A-38E. A pulley chain or belt 36A couples pulley wheels 34A and 38A; chain/belt 36B couples pulley wheels 38A and 38B; chain/belt 36C couples pulley 38B and 38C; chain/belt 36D couples pulley 38C and 38D; chain/belt 36E couples pulley 38D and 38E; and chain/belt 36F couples pulley wheels 38E and 34B. By
- 25 virtue of this arrangement, each of the pulley wheels 38 and thus each of the banks of blades 16 are rotated in the same direction. A series of idler rollers 40 is provided for applying tension to the chain/belts 36B, 36C, 36D and 36E.

When the frame 12 of apparatus 10 is connected to say a bobcat or front end loader, the bobcat or front end loader can be used to manipulate the frame 12 to scoop up a

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supply of particulate material which is supported on the blades 20, and if desired elevate the frame 12 above the ground so that a pile of screened material can be formed below. Then the hydraulic motors 32 is activated to cause rotation of the blades 20. As the blades rotate they agitate the particulate material and allow particles of a size smaller than the sizing gap G to pass between the banks of blades 16 and through the open bottom 14. The blades 20 may also act to crush or break the particulate material down to a size which will pass through the sizing gap. Material which is of a size larger than the sizing gap and is not crushed or otherwise broken (hereinafter referred to as "oversized particles") remain on top of the blades 20. Eventually, the amount of oversized particles supported on the blades 20 reaches a stage where it prohibits the efficient screening of any further particulate material. At this time, the oversized material is simply dumped from the frame 12 at a suitable location.

The freeplay in the banks of blades 16 which allows axial movement has been found to assist in preventing clogging of the apparatus 10.

Now that an embodiment of the apparatus 10 has been described in detail it will be apparent to those skilled in the relevant arts and numerous modifications and variations may be made without departing from the basic inventive concepts. For example, the present embodiment illustrates the use of five banks 16 of blades. However, the number of banks can be varied to suit the application at hand. Also, the outer most banks 16A and 16E as shown as being raised above the remaining banks to form a cradle like structure or shape of banks 16. However this is not necessary; in other configurations all the banks 16 can be in the same plane, or arranged in an alternating "up and down" configuration. Further, the degree of freeplay in the banks 16 can be made adjustable to allow adjustment of the freeplay for different applications. This can be provided for by simple known mechanical devices such as threaded collars, lock nuts and shims etc which can be moved axially along the axle 30 and then locked in place. Also, while the frame 12 in this embodiment is in the form of a bucket or scoop from a bobcat or front end loader, it can take any other suitable form such as a simple rectangular or square box like

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structure having an open top and an open bottom. Any type of particulate material can be screened, crushed, mixed or blended with this apparatus such as for example gravel, sand, soil, aggregates, humus etc. Also, while the banks 16 are described as being rotated in the same direction, they can be arranged to rotate in different
5 directions by use of conventional gearing. All such modifications and variations together with others which would be obvious to a person of ordinary skill in the art are deemed to be within the scope of the present invention the nature of which is to be determined from the foregoing description and the appended claims.

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PCT/AU99/00135
Received 21 December 1999

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The Claims that Define the Invention are as Follows:

- 5 1. A screening apparatus for screening a particulate material composed of particles of different size, said apparatus including:
a screen frame having an open bottom through which screened particles can pass;
a plurality of banks of blades supported on the screen frame; each bank having a plurality of evenly spaced blades arranged in a row and rotatable about a respective
10 axis, the axes being parallel to each other, with adjacent banks of blades axially offset relative to each other so that the blades of one bank alternate with the blades of an adjacent bank, and wherein at least one bank of blades is linearly slidable along its axis of rotation to provide a predetermined amount of axial freeplay and where a sizing gap is formed between mutually adjacent blades of adjacent banks;
15 wherein, when the blades are rotated and a particulate material is placed on the blades, the rotating blades agitate and/or crush the material to allow particles of a size equal to or smaller than the sizing gap to pass between the blades and through the open bottom.
- 20 2. A screening apparatus according to claim 1 wherein the blades are juxtaposed so that the blades on one bank extend transversely between the adjacent blades of an adjacent bank.
- 25 3. A screening apparatus according to claim 2 wherein said blades are configured and juxtaposed so that if the blades of one bank were directly opposite the blades of an adjacent bank the opposed blade would intermesh.
- 30 4. A screening apparatus according to claim 3 wherein said screen frame is in the form of a bottomless scoop or bucket adapted for coupling to an earthmoving vehicle whereby said vehicle can be controlled to manipulate said scoop or bucket to scoop particulate material into said screen frame and/or elevate said screen frame above the ground while said blades are rotated.

PCT

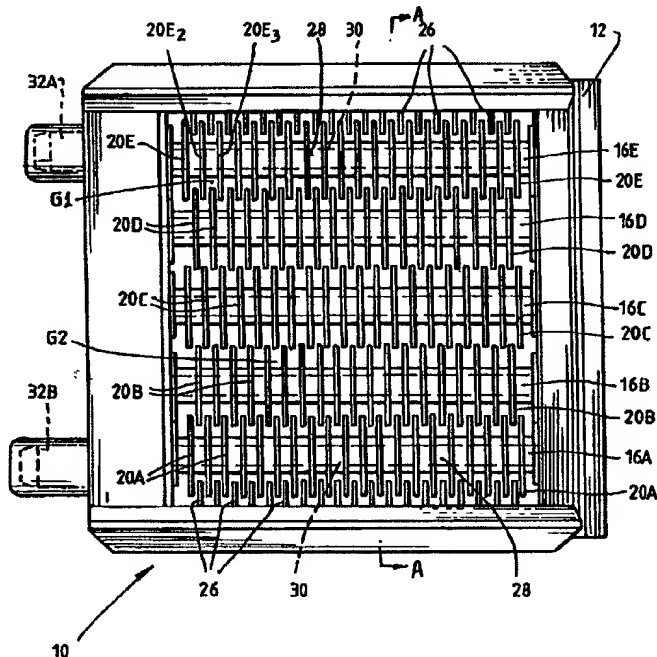
WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : B07B 1/12, B02C 13/06, 13/20, E02F 3/00, 9/00	A1	(11) International Publication Number: WO 99/44758 (43) International Publication Date: 10 September 1999 (10.09.99)
(21) International Application Number: PCT/AU99/00135 (22) International Filing Date: 5 March 1999 (05.03.99) (30) Priority Data: PP 2204 5 March 1998 (05.03.98) AU (71) Applicant (for all designated States except US): MISU PTY LTD. [AU/AU]; 98 President Street, Welshpool, W.A. 6106 (AU). (72) Inventor; and (75) Inventor/Applicant (for US only): KUHMONEN, Mauri [FV/FI]; Kallinmaentie 31, FIN-63800 Soini (FI). (74) Agent: MIZZI, Anthony, Paul; Griffith Hack, Level 6, 256 Adelaide Terrace, Perth, W.A. 6000 (AU).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report.

(54) Title: SCREENING APPARATUS**(57) Abstract**

A screening apparatus (10) for screening particulate material includes a frame (12) having an open bottom (14) through which screened particles can pass and a plurality of banks of blades (16A-16E) supported on the frame (12). Each bank of blades (16) is rotatable about respect axes of rotation (18A-18E). The blades (20) of each bank (16) are evenly spaced and arranged in a single row coincident with their respective axes of rotation (18). At least one of the banks of blades (16) is able to slide linearly along its respective axis of rotation (18) to provide a predetermined amount of axial freeplay. When the blades (20) are rotated and a particulate material is placed in the screen frame (12), the rotating blades (20) agitate and/or crush the material to allow particles of a size equal to or smaller than a gap formed between each of the adjacent blades to fall through the open bottom.



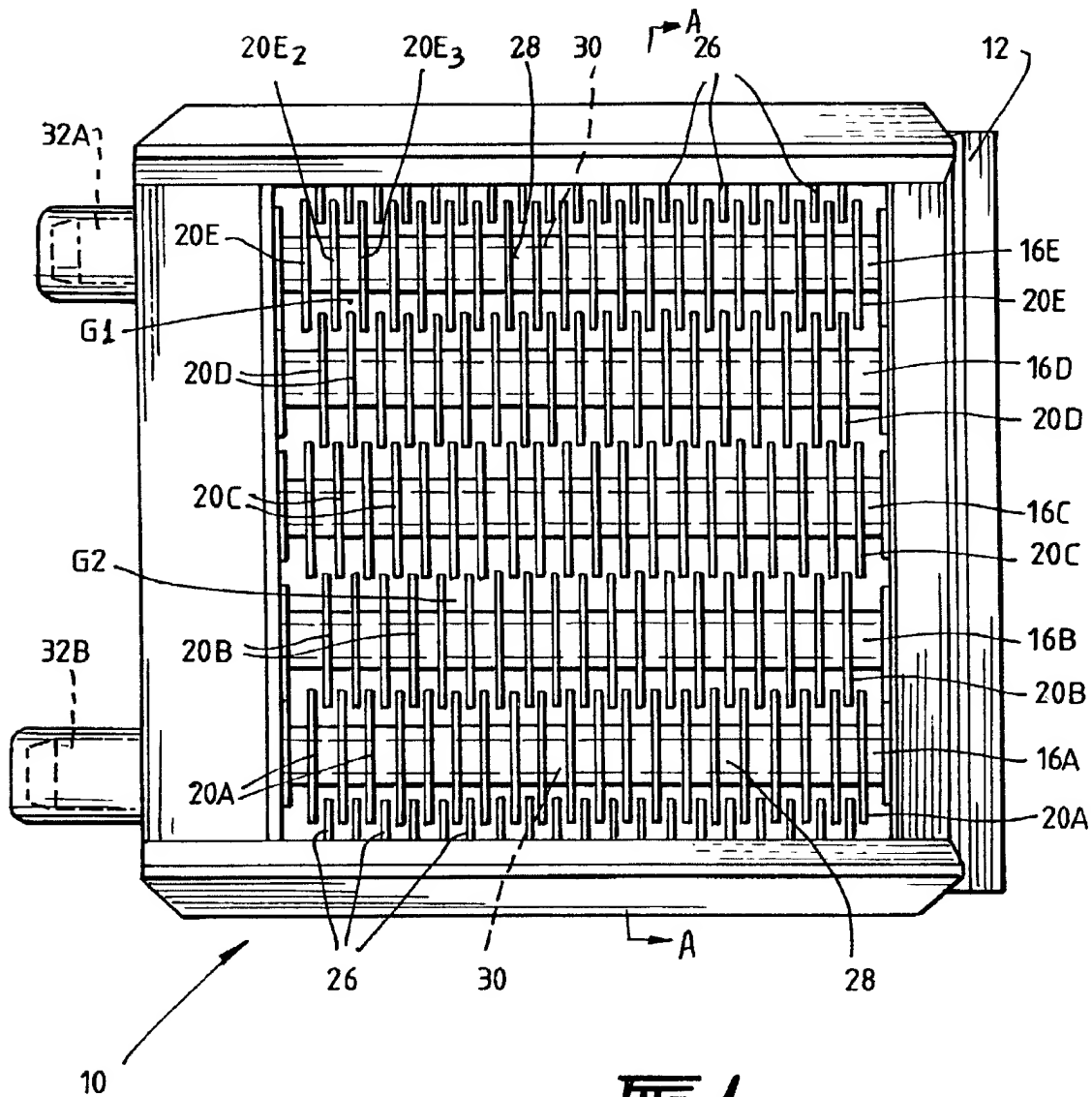


Fig. 1.

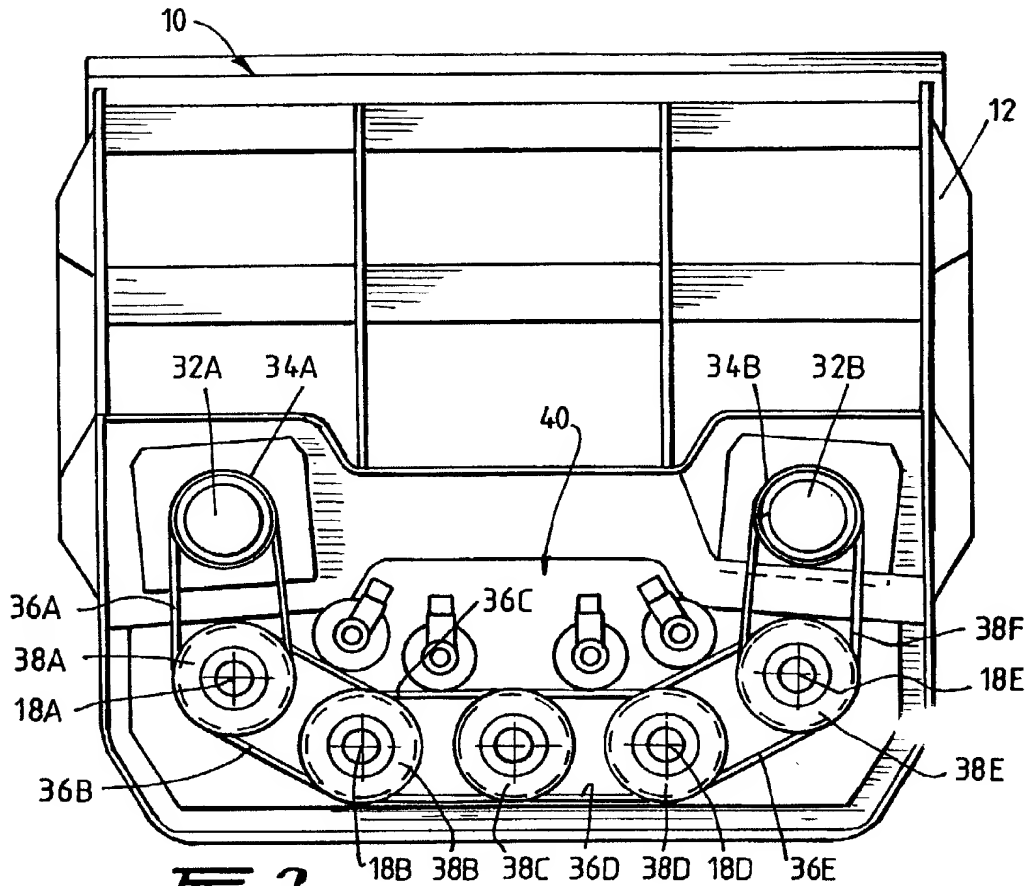


FIG. 2.

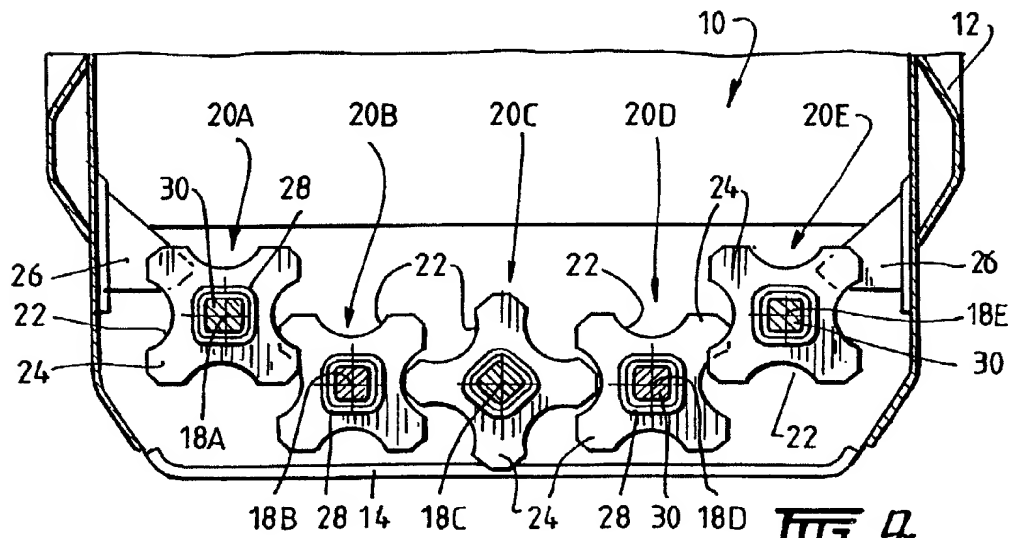


FIG. 4.

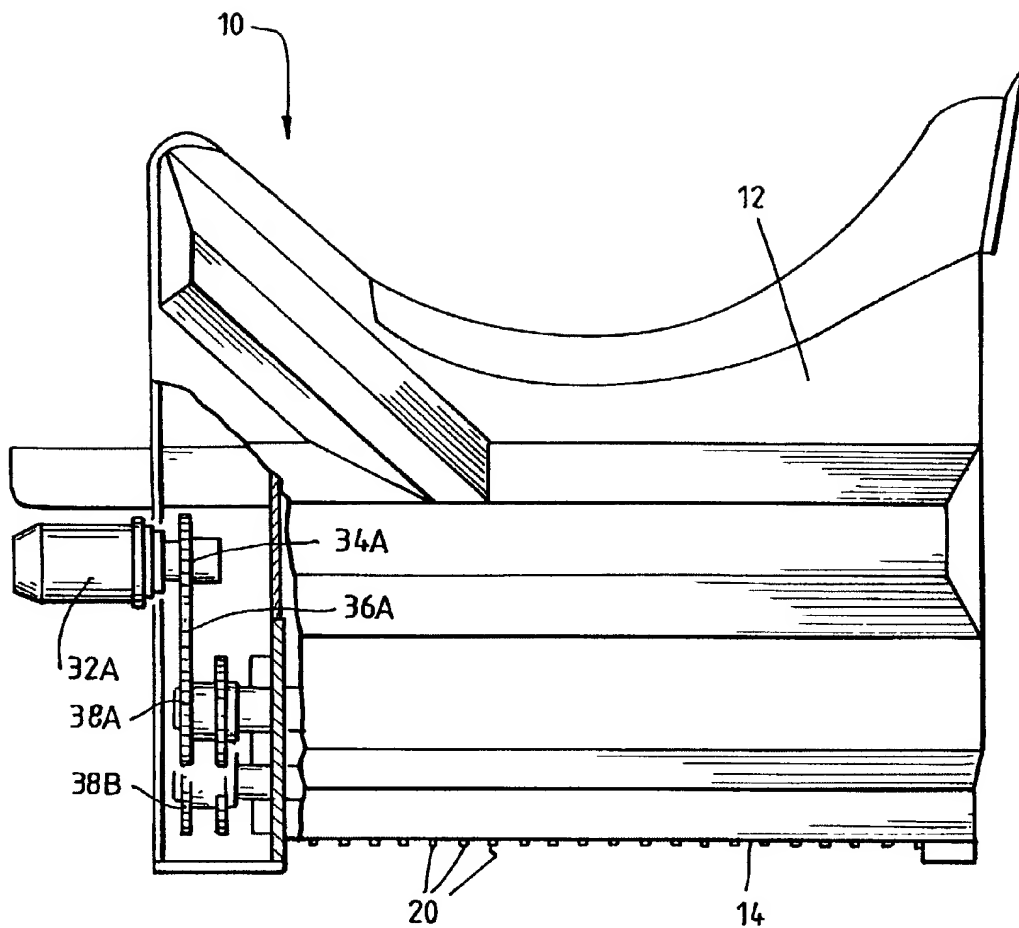


FIG. 3.

Declaration For U.S. Patent Application

And Power of Attorney

(PTO/SB/01)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SCREENING APPARATUS

the specification of which (Check one of blocks 1, 2 or 3)

1. ☐ is attached hereto.

2. ☒ was filed on 05 March 1999 as International PCT Application Serial No. PCT/AU99/00135 and was amended on 21 December 1999 (if applicable).

3. ☐ was filed on _____ as U.S. Application Serial No. _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claim(s), as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

List of Prior Foreign Applications (if applicable)

(Application Number)	(Country)	(Day/Month/Year Filed)	CERTIFIED COPY ATTACHED? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
PP2204	Australia (AU)	05 March 1998	
_____	_____	_____	<input type="checkbox"/> Yes <input type="checkbox"/> No
_____	_____	_____	<input type="checkbox"/> Yes <input type="checkbox"/> No

☐ Additional foreign application numbers are listed on the attached sheet, PTO/SB/02B - Supplemental Priority Data Sheet or similar sheet.

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below:

List of U.S. Provisional Applications (if applicable)

(Application Number)	(Day/Month/Year Filed)
_____	_____
(Application Number)	(Day/Month/Year Filed)
_____	_____

☐ Additional provisional application numbers are listed on the attached sheet, PTO/SB/02B - Supplemental Priority Data Sheet or similar sheet.

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

List of U.S. Parent Application Or PCT Parent Numbers (if applicable)

(Number)	(Day/Month/Year Filed)	(Status: Abandoned; Pending; Patent Number, if applicable)
_____	_____	_____
(Number)	(Day/Month/Year Filed)	(Status: Abandoned; Pending; Patent Number, if applicable)
_____	_____	_____
(Number)	(Day/Month/Year Filed)	(Status: Abandoned; Pending; Patent Number, if applicable)
_____	_____	_____

☐ Additional U.S. or PCT international application numbers are listed on the attached sheet, PTO/SB/02B - Supplemental Priority Data Sheet or similar sheet.

And I hereby appoint as principal attorneys and agents, James O. Ray, Jr., Reg. No. 27,666; Forest C. Sexton, Reg. No. 22,054; Edmond S. Miksch, Reg. No. 38,558; James R. Stevenson, Reg. No. 38,755; Robert A. Shack, Reg. No. 29,976; Amos Bartoli, Reg. No. 42,299; and Michele Yoder, Reg. No. 41,562.

Please direct all correspondence to the following address:

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 Telephone: (412) 380-0725
 Facsimile: (412) 380-0748

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 of Title and that such willful false statements may jeopardize the validity of the application or any patent issue thereon.

Full Name of Sole or First Inventor: **MAURI KUHMOMEN**

Inventor's signature: *Mauri Kuhmomen*

Date: *27/4/2001*

Residence: **Kallinmaentie 21, Finland-63800 Soini** *FIX*
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Citizenship **Finland (FI)**

Post Office Address **Kallinmaentie 21, Finland-63800 Soini**

Full Name of Second Inventor: _____

Inventor's signature: _____

Date: _____

Residence: _____
 (Street, City, State, Zip Code, Country)

Citizenship _____

Post Office Address _____

Full Name of Third Inventor: _____

Inventor's signature: _____

Date: _____

Residence: _____
 (Street, City, State, Zip Code, Country)

Citizenship _____

Post Office Address _____

Full name of Fourth Inventor: _____

Inventor's signature: _____

Date: _____

Residence: _____
 (Street, City, State, Zip Code, Country)

Citizenship _____

Post Office Address _____

[] Additional inventors are listed on the attached sheet, PTO/SB/02A - Supplemental Additional Inventor(s) Sheet or similar sheet.